

# Collisional + Photo Ionization Plasma Emission Software (CPIPES)

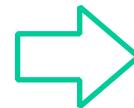
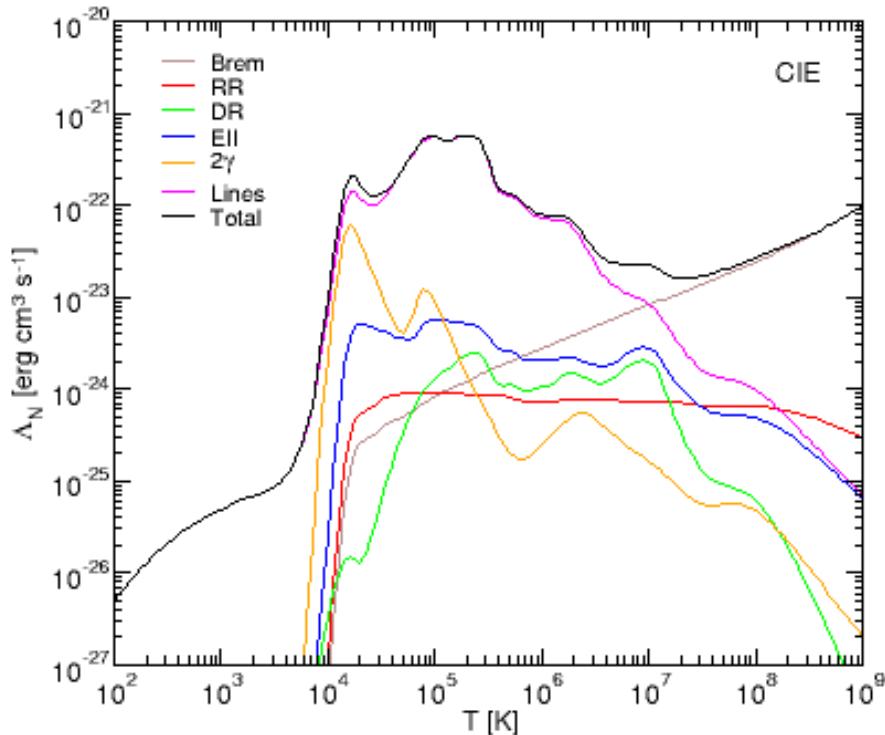
M. A. de Avillez

Atomic and molecular plasma module

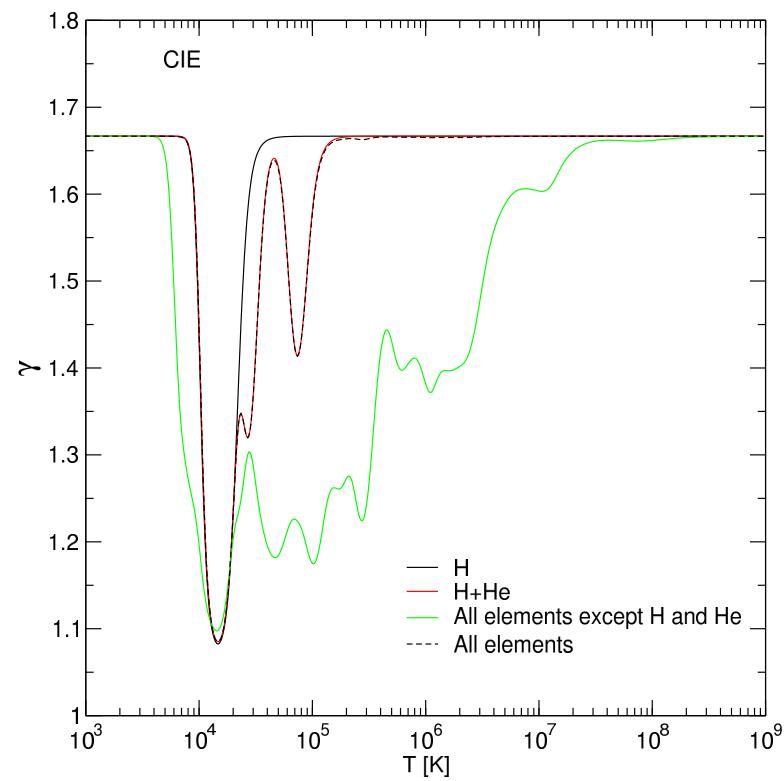
OpenCL + Fortran 2008 + OpenMP

Tailored for heterogenous computing  
(CPUs + GPUs + Intel Xeon Phi X200)

Use in HD/MHD/CR-MHD AMR codes



Variability of  $\gamma = c_p/c_v$   
de Avillez+ 2018



Depends on the ionic and  
excitation state of the plasma